Identifying potential stroke

Paediatric stroke is often a late diagnosis, taking 21-24 hours, and as the thrombolysis window is 4.5 hours, many children will miss the opportunity to receive this potentially life-changing treatment.

As a radiologist, it is important to recognise which children are at risk of stroke. The main risk factors are infection, arteriopathies (such as focal cerebral atrophy), cardiac conditions (both congenital and acquired, pre- and post-surgical), haemoglobinopathies (such as sickle cell disease), and arterial dissection. It should be noted that in children, dissection can occur with seemingly innocuous trauma, such as neck movement during a roller coaster ride.

The presenting symptoms may be non-specific in children: these include focal neurological deficits, headache, seizures, and change in conscious level.

Urgent brain imaging

CT brain should be obtained within 1 hour of admission. In the absence of haemorrhage and if stroke is suspected, a CTA (from the aortic arch to vertex) should be undertaken to assess for vessel occlusion.

Unlike in adults, vessel occlusion corresponding to the presenting symptoms must be demonstrated in order for a child to be a candidate for thrombolysis. Imaging should not be delayed in order to obtain MRI. MRI should only be the initial imaging modality if it can be performed within the one hour window.

If stroke is still suspected (but not confirmed) following CT, MRI should be obtained within 24 hours.

The guidelines recommend immediate transfer and review of imaging by paediatric neuroradiologists when required.

Interpretation of imaging

The general radiologist should be confident in their ability to diagnose ischaemic stroke, haemorrhagic stroke, and stroke mimics. In children, these mimics may include tumours, demyelination, and infections. MRI enables further characterisation. If haemorrhagic stroke is identified, urgent discussion with neurosurgeons is recommended. If arterial stroke is suspected, immediate transfer of images and discussion with a paediatric neuroradiology/intervention centre should be undertaken with consideration for thrombectomy, thrombolysis, or decompression where appropriate.

Thrombolysis for acute ischaemic stroke

As in adults, thrombolysis must be performed within 4.5 hours of the onset of symptoms. However, there must also be corresponding vessel occlusion on CTA or MRA.

Conclusion

Radiologists play an integral role in the paediatric stroke pathway, not only in providing interpretation of images, but in the recognition of children at risk of stroke, the expedition of imaging, and patient management (discussion with referring clinicians regarding further management options such as thrombectomy and thrombolysis).